



A NATIONAL STRATEGY TO RESTORE COASTAL AND ESTUARINE HABITAT

Executive Summary





Dear Friend,

The rich interplay between the land and the sea creates one of America's most valuable natural, economic, and cultural resources—its estuaries and coasts. In this unique nexus—characterized by the dynamic blending of salt and fresh water during tidal cycles—abundant life is created and nurtured.

Estuaries nurture not only shellfish, fish, and wildlife, but also nourish the human spirit. We are from the sea, and we are continually lured back to its edge, reinforcing the kinship we share with this place as we sail, fish, swim, and relax near a glistening bay or a rocky shore.

And yet, no place on earth more directly embodies the challenge of balancing human needs and the needs of other species than estuaries. By 2025, 75 percent of our population will live within 50 miles of the coast. We must learn how to develop our own habitat while also protecting and restoring the very essence of what binds us to our coasts.

Restore America's Estuaries and the National Oceanic and Atmospheric Administration are pleased to present *A National Strategy to Restore Coastal and Estuarine Habitat*, and we are grateful to the scores of scientists, restoration practitioners, program managers, and others who contributed their expertise and insights. This *National Strategy* takes a major step toward reclaiming losses of the past 200 years. We look forward to continued collaboration as we move forward and reinvest in our coastal and estuarine habitats.

Best Regards,

Mark Wolf-Armstrong
President
Restore America's Estuaries

Scott B. Gudes
Acting Administrator and Deputy
Under Secretary
National Oceanic and Atmospheric
Administration

ESTUARIES *are one of America's most valuable natural resources—and they are in decline.*



Taking action to broaden partnerships and provide adequate funding for estuarine and coastal habitat restoration will nurture our fish and wildlife, our lifestyles, our spirits, and our economy.

ESTUARIES ENRICH OUR NATION

Estuaries—the vibrant coastal zones where rivers join with the sea—are uniquely productive natural systems. In this rich interface of marine and terrestrial worlds, fresh and salt waters merge in a swirling ebb and flow ruled by ancient cycles of the tides. Here, abundant life is created and nurtured, enriching not only the oceans but also the economies of coastal communities and the human spirit.

Estuaries and estuarine-like habitats, such as those in the Great Lakes, are composed of many habitat types, including salt marshes, oyster reefs, swamps, and seagrass meadows. Together, this mosaic of habitats forms versatile living systems that sustain a remarkable diversity of life forms:

- ❖ The Chesapeake Bay provides food, water, cover, and nesting or nursery areas to more than 3,000 migratory and resident wildlife species.
- ❖ Estuarine areas of Puget Sound support 220 species of fish, 26 species of marine mammals, and 100 species of sea birds, shore birds, and waterfowl.

- ❖ Over 90% of the roughly 200 fish species in the Great Lakes are directly dependent on coastal wetlands for some part of their life cycle.
- ❖ Galveston Bay supports a population of finfish totaling more than 162 species.

Estuaries provide critical habitat for many species of fish, shellfish, and seagrasses. They serve as nursery and spawning grounds for a number of endangered and threatened species.

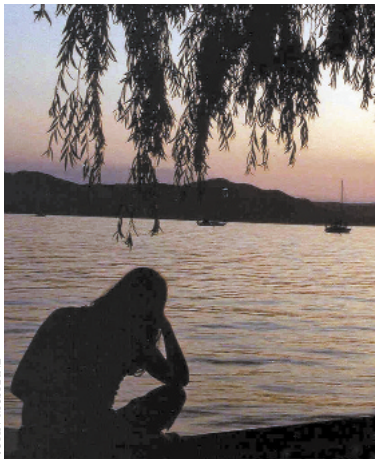
HEALTHY COASTS ARE ESSENTIAL TO HEALTHY ESTUARIES

Coastal habitats are an indispensable part of the nation's significant natural resources and sustain much of its economy. These habitats, from the watersheds to the open ocean, nourish one another, their biology and chemistry inextricably linked—what restores one protects the other.



COASTAL POPULATIONS ARE BOOMING

Humans have always been drawn to the shore, lured and lulled by tidal rhythms. Fishing, boating, floating



JOHN MCSHANE

on the waves, sunning on the sand—these are primal pleasures that restore our spirit. People are flocking to our shorelines in growing numbers, putting more pressures on estuarine and coastal habitats while requiring more ecosystem services from them:

- ❖ Our coastal population is growing faster than the nation's population as a whole, and that trend is expected to continue.
- ❖ Coastal counties constitute only 10% of the land in the lower 48 states

but have nearly five times the population density of the rest of the country.

- ❖ The New York–New Jersey Harbor Estuary is enjoyed by 20 million residents and more than 17 million annual visitors.
- ❖ By 2025, 75% of the U.S. population will live within 50 miles of a coast.

OUR ESTUARIES ARE IN TROUBLE

Like so many natural environments, our estuaries and coastal environments have fallen on hard times, degraded by decades of interference with their habitats and complex processes. No region of the country has been spared:

- ❖ 95% of San Francisco Bay's original wetlands have been destroyed.
- ❖ 85% of Galveston Bay's seagrass meadows are gone.
- ❖ More than 30% of Connecticut's coastal wetlands have been lost.
- ❖ 25 square miles of coastal Louisiana wetlands disappear each year.



CHESAPEAKE BAY FOUNDATION

These losses translate into major losses in revenue and incalculable losses to our world:

- ❖ Oyster harvests in Chesapeake Bay plummeted from 25 million pounds to one million pounds in just 30 years.
- ❖ The number of wild salmon returning to Maine's rivers has dropped 80% in the last ten years.

No single culprit is behind the national loss and degradation of coastal habitats. It derives from an accumulation of environmental insults: dredging, filling, navigation, mineral and gas extraction, altered salinity, draining, bulldozing, paving, dams, toxic runoff, sewage discharges, erosion, and the coastward migration of people—problems compounded by a lack of coordinated attention to the problem.



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A HEALTHY COASTAL ECOSYSTEM GIVES US LIFE AND LIVELIHOOD

The prolific life supported by healthy coastal and estuarine habitat is the foundation of the economic base of coastal communities and the nation, through tourism, commercial and recreational fishing, aquaculture, and other income-producing business sectors:

- ❖ 75% of commercially harvested fish and shellfish depend on estuaries and nearby coastal waters for some part of their life cycle.
- ❖ \$3.5 billion worth of U.S. commercial finfish and shellfish were landed in 2000.
- ❖ 75% of threatened or endangered mammals and birds depend on estuaries.
- ❖ \$8 to \$12 billion is generated each year by coastal activities such as canoeing and kayaking, bird watching, swimming, sport fishing, and tourism.
- ❖ 75% of U.S. migrating waterfowl depend on the Gulf of Mexico's coastal wetlands.



Estuaries are nurseries for millions of animals, and sources of tangible and intangible sustenance for the legions of Americans who live, work, or play at our shores.

COASTAL WETLANDS ARE NATURE'S WATER TREATMENT SYSTEM

Healthy and intact tidal wetlands:

- ❖ Provide a critical physical buffer between land and water, protecting communities from devastating floods
- ❖ Remove pollutants from runoff and trap nutrients that plants rely on for growth
- ❖ Filter water flowing from rivers and tributaries to the oceans

WE NEED TO PRESERVE AND RESTORE OUR ESTUARIES AND COASTS

Our human and natural environments are at risk, as are the livelihoods and quality of life factors dependent on healthy coastal and estuarine systems. Preservation and enhancement of existing coastal and estuarine habitat are critical components of successful restoration. Estuaries and other coastal habitats can be restored only through long-term stewardship and by developing the constituencies, policies, and funding needed to support these efforts. Greater public awareness, understanding, and involvement in restoring habitats are necessary to the success of individual projects and achieving national restoration goals.

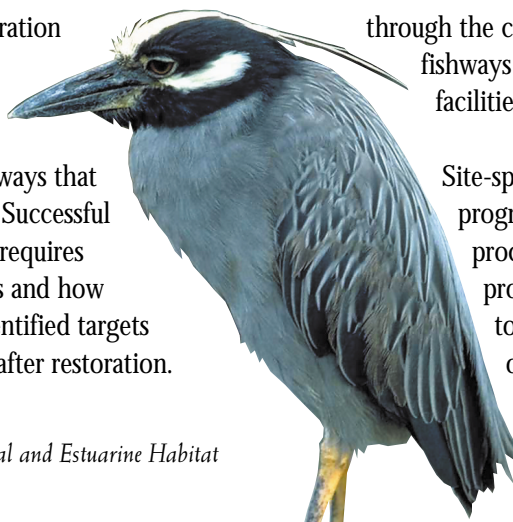
The restoration response therefore must be implemented swiftly and in ways that increase the opportunity for success. Successful restoration of any natural ecosystem requires sound understanding of the problems and how they developed, as well as clearly identified targets for what we expect from the system after restoration.

WE NEED TO BUILD ON REGIONAL, STATE, AND LOCAL RESTORATION SUCCESSSES

Restoration of coastal and estuarine habitat has been ongoing for many years. Through individual projects we have learned and developed the techniques and ability to support a national effort.

- ❖ An experimental technique being applied in the Chesapeake Bay involves using marine limestone as an alternative substrate for restoring oyster reefs.
- ❖ Mangrove restoration in Biscayne Bay is improving water quality and benefiting fish and wildlife.
- ❖ Restoration efforts in coastal Louisiana are preventing beach erosion by building brush fences and breakwaters, rebuilding coastal ridges, marsh terracing, using dredged materials, and revegetating coastal dunes.
- ❖ In the Pacific Islands, restoration efforts are removing debris and nets from coral reefs, controlling invasive species, and limiting contaminant discharges and harmful sedimentation.
- ❖ In Puget Sound, sloughs and streams are being reconnected and recreated to restore marshes and upstream areas.
- ❖ Lake Ontario fish corridors are being restored through the construction of upstream fishways and downstream passage facilities.

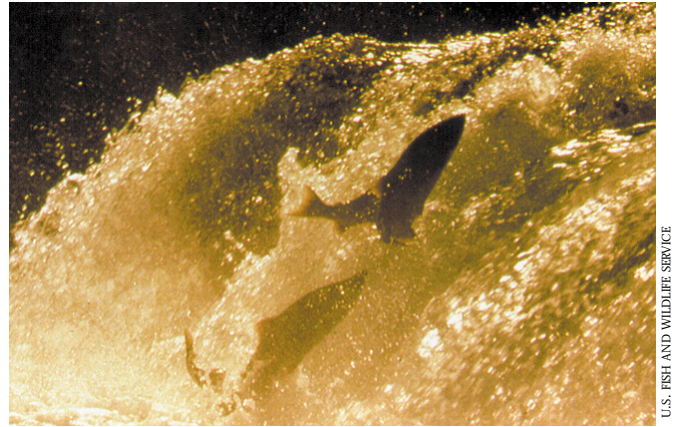
Site-specific activities have made progress in restoring the natural processes that make estuaries so productive. We are now ready to move forward and build on these experiences.



WE NEED A NATIONAL STRATEGY

It is now clear that isolated projects cannot harness enough human and financial resources to outpace the rate of loss. Trends with serious implications for our country continue unabated:

- ❖ Our fishery stocks are dropping below critical levels and crashing.
- ❖ Rising sea level and erosion are consuming the natural buffers that protect our communities from storms and floods.
- ❖ Coastal human populations are climbing daily.
- ❖ In addition to reducing populations of fish and wildlife, urbanization of the coastal Great Lakes has left a legacy of health advisories against eating contaminated fish, as well as beach closures every summer.
- ❖ Salmon runs on both coasts are severely reduced, due in part to loss of tidal wetlands.



U.S. FISH AND WILDLIFE SERVICE



NOAA, DEPARTMENT OF COMMERCE

A national strategy is needed to restore dwindling tidal basins, salt marshes, seagrass meadows, mangrove swamps, coastal forests—the full mosaic of habitats that forms the nation's coasts and estuaries. A strategic approach improves efficiency and effectiveness and ensures that priorities are established, programs are coordinated, and public expectations are both set and met. Working with uniform standards toward common goals, local and state jurisdictions can achieve a lasting impact on a regional and national scale.

A national strategy has many compelling features:

- ❖ It creates a consensus vision of priorities for the nation while recognizing that different areas have different problems and needs that may be addressed by different programs or authorities.
- ❖ It identifies the most urgent needs so that resources can be allocated accordingly and lays out principles and objectives that help us make those difficult choices.
- ❖ It helps keep plants and animals off the Endangered Species list by restoring the habitats many species need to survive.
- ❖ It acknowledges that other activities that take place along coasts and in estuaries present opportunities for restoration—from using dredged material to create marshes to using compost to stimulate plant growth.
- ❖ It ensures that all types of projects at all stages—well-established programs, single-action projects, and start-up activities—work toward fully functioning coastal and estuarine systems, even if they accomplish that goal one restoration project at a time.

Together, these attributes make a national strategy a powerful tool in restoring our embattled coasts and estuaries for present and future generations.



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A NATIONAL STRATEGY to Restore Coastal and Estuarine Habitat

The strategy presented here has been developed by scientists, community leaders, non-governmental organizations, and representatives of government agencies at all levels, sharing their expertise and diversity of views over an 18-month period. Restore America's Estuaries, a non-profit organization, and the National Oceanic and Atmospheric Administration led and coordinated the nationwide process that culminated in *A National Strategy to Restore Coastal and Estuarine Habitat*.

The purpose of this *National Strategy* is to provide a framework for restoring function to coastal and estuarine habitat. It supports the goal of restoring one million acres of estuarine habitat by 2010 as set forth in the Estuary Restoration Act (see sidebar), and it can be applied to improve the effectiveness of restoration efforts conducted under any program.

This document is comprised of three main sections that together will forward the nation's efforts to restore coastal and estuarine habitat on a broad and coordinated scale.

OBJECTIVES

This section sets forth strategic objectives to restore function to coastal and estuarine habitat. Specific objectives and action items support progress toward the goal of restoring one million acres of estuarine habitat as set forth in the Estuary Restoration Act.

FRAMEWORK FOR IMPLEMENTATION

This section assists restoration planners, practitioners and others with coastal and estuarine habitat restoration planning. It provides guidance on developing a

THE ESTUARY RESTORATION ACT OF 2000

The Estuary Restoration Act was signed into law in November of 2000 with strong bipartisan support. The Act makes a strong federal commitment and encourages public-private partnerships to restore habitat in America's estuaries. The Act:

- ❖ Makes restoring America's estuaries a national priority.
- ❖ Creates the federal Estuary Habitat Restoration Council.
- ❖ Requires the development of an Estuary Habitat Restoration Strategy.
- ❖ Sets a goal of restoring one million acres of estuarine habitat by 2010.
- ❖ Authorizes \$275 million over five years for restoration projects.
- ❖ Requires enhanced monitoring, data sharing, and research capabilities.

comprehensive and inclusive planning effort directed at restoration needs and opportunities throughout a watershed, setting restoration priorities within regional restoration plans, and selecting and designing projects that contribute to the goals of estuarine scale plans.

REGIONAL ANALYSES OF RESTORATION PLANNING

This section includes six regional analyses that assess the status of and identify future needs and directions for estuarine habitat restoration planning. The regions are: the Northeast Atlantic, the Southeast Atlantic, the Gulf of Mexico, California and the Pacific Islands, the Pacific Northwest, and the Great Lakes. The analyses, based on an extensive inventory of planning efforts related to estuarine habitat restoration, review key habitats and species, major threats, current planning efforts and restoration goals, restoration methods, and information needs that have been identified to date.

A NATIONAL STRATEGY focuses and leverages resources to provide a proactive response to the loss of estuarine and coastal habitat.

A National Strategy consists of this document as well as several other powerful tools and resources to assist restoration practitioners and decision-makers across the nation:

- ❖ an on-line, searchable database of funding opportunities for habitat restoration,
- ❖ an on-line, searchable database of restoration plans,
- ❖ the *Principles of Estuarine Habitat Restoration*,
- ❖ an interactive cd-rom containing this document and other resources, and
- ❖ a dynamic web site - <http://restoration.nos.noaa.gov>.

FINDINGS *and* Recommendations

A *National Strategy* calls for habitat restoration on an unprecedented scale. We are now ready to undertake this new level of coastal and estuarine habitat restoration:

- ❖ People are ready to volunteer their labor and skills—tens of thousands of people already participate in restoration activities through schools and community groups.
- ❖ The science of restoration is ready—advances in restoration science have enabled countless successful restoration projects and an increased understanding of coastal and estuarine systems.
- ❖ The emerging industry of restoration is ready to be engaged.
- ❖ The government is ready—all levels of government, from towns and counties to state and federal agencies, are leading restoration efforts.

Taken together, the findings and recommendations presented here provide a framework for restoring function to coastal and estuarine habitat and support progress toward implementation of the Estuary Restoration Act.

■ HABITAT RESTORATION

Finding

Estuaries are uniquely productive natural systems that perform vital and irreplaceable ecosystem services. Healthy estuaries are crucial to continued economic and ecological prosperity. Taking action to restore these vital resources improves us as human beings.

Discussion

Healthy estuaries and coastal habitats contribute to our economic base through tourism, recreational fishing, aquaculture, and other income-producing business sectors. Healthy coastal habitats such as wetlands and riparian forests trap sediment and nutrients and serve as a buffer to protect communities from the devastation caused by flooding. By restoring function to these important habitats, we restore the invaluable services they provide.

Recommended Action

Implement restoration projects to provide healthy ecosystems that support wildlife, fish, and shellfish; improve the quality of surface water and ground water; enhance flood control; and increase opportunities for outdoor recreation.



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■ RESTORATION PARTNERSHIPS

Finding

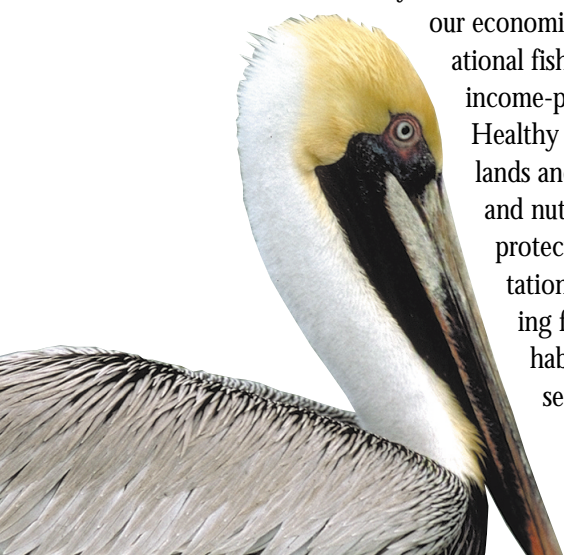
Participation and coordination among diverse public and private groups are necessary components of successful restoration. More than 60 federal programs are equipped to play a role in habitat restoration, and dozens of state and local programs and non-governmental organizations are actively restoring habitat.

Discussion

In order to maximize effectiveness at the federal, state, and local levels, public and private restoration partnerships need to be created and implemented. Restoration plans should encourage partnership development among diverse stakeholders and include a high degree of hands-on community involvement. Sharing and disseminating effective models for program coordination will encourage new and stronger partnerships.

Recommended Action

Create and maintain effective restoration partnerships that include diverse public and private organizations and agencies to maximize effectiveness at the federal, state, and local levels.



■ RESTORATION PLANNING AND PRIORITY-SETTING

Finding

There are substantial gaps in estuarine habitat restoration planning in every region of the coastal United States. In many estuaries, no planning effort has focused directly on estuarine habitat restoration.

Discussion

Approaches to estuarine habitat restoration will vary according to specific local and regional needs, including loss of historic habitat and associated values, and current priorities and goals. On-the-ground restoration projects are most effective when they are part of a larger planning effort that sets goals and priorities.

Recommended Action

Utilize the Regional Analyses and planning frameworks in this *National Strategy* to take the next step in habitat restoration planning in each estuarine and coastal region of the United States. In most cases, this will include completing coastal and estuarine habitat restoration plans. This action should not preclude or delay restoration action in coastal and estuarine habitats. The knowledge, skills, and technologies exist to make substantial improvements in the near term.

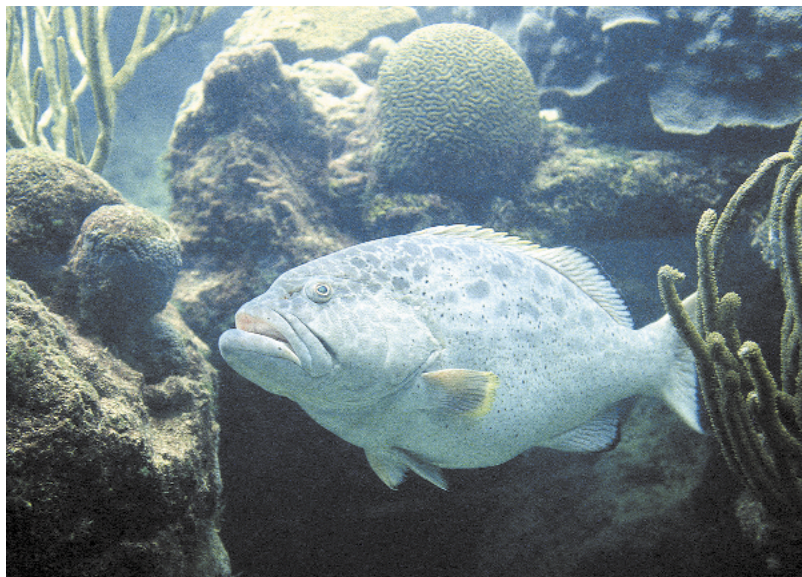
■ SCIENCE AND TECHNOLOGY

Finding

The best available restoration science and technology is required for successful project design, implementation, and monitoring. In every coastal region of the United States, more information is needed on how to best restore the basic functions of habitat.

Discussion

Research on restoration science and technology is ongoing, and restoration planning and projects should reflect this changing body of knowledge. Coastal regions have much to offer one another in terms of innovative and successful approaches to restoration. It is important to develop a mechanism for broad distribution of information and share lessons learned in the field of restoration. Technical guidance is needed on restoring priority habitats, potential benefits and



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drawbacks of recommended restoration techniques, monitoring plans, and measures for evaluating project success.

Recommended Action

Apply the best appropriate restoration science and technology in project design and implementation.

■ EVALUATION AND MONITORING

Finding

Evaluating progress in coastal and estuarine habitat restoration at the project, estuarine, and national scales is essential to long-term success.

Discussion

Through project monitoring and tracking of progress at the watershed level, restoration program managers and practitioners can assess the effectiveness of their efforts and incorporate new information and techniques in project design and watershed-level priorities.

Recommended Action

Regularly evaluate progress toward restoring function to coastal and estuarine habitat to determine whether the approaches in this *National Strategy* are making a difference.

■ OUTREACH AND EDUCATION

Finding

The restoration and maintenance of healthy estuaries will require the long-term support of a broad cross-



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section of the public, including those who live on or near the coast and those who live inland.

Discussion

Successful restoration efforts require an informed public willing to support the policies, funding, and changes in lifestyle needed to restore and maintain estuaries as healthy and productive ecosystems. Local stewardship will facilitate long-term conservation and success at these restoration sites.

Recommended Action

Facilitate community and volunteer involvement in construction, maintenance, and monitoring of coastal and estuarine habitat restoration projects.

FUNDING

Finding

The Estuary Restoration Act of 2000 authorizes \$275 million over five years for estuarine habitat restoration projects and calls for leveraging existing public and private resources to maximize the effectiveness of restoration efforts.

Discussion

This Act provides an excellent opportunity to fund restoration activities that otherwise would go unfunded. Sufficient funding, both public and private, should be made available to implement restoration planning activities, on-the-ground projects, monitoring, and outreach measures to achieve the goals of the Act. Because estuaries provide substantial benefits to the regions in which they are located, governments at all levels should demonstrate strong support for estuarine restoration. Funded restoration projects should be cost-effective, technically feasible, scientifically sound, and address restoration priorities in their local, regional, and national plans.

Recommended Action

Fully fund the Estuary Restoration Act of 2000 and maintain existing state and federal funding sources.

Conclusion

A *National Strategy* helps to ensure a coordinated and consistent response to the loss of coastal and estuarine habitat. It is based on knowledge gained in prior decades, existing planning efforts, and the recognition that public and private interests must work together to achieve the goal of coastal and estuarine habitat restoration.

A strategic approach balances the pressures and realities of economic development and growing coastal communities with the need to sustain the resource base for the long-term benefit of the ecosystem, including fishery harvest, tourism,

and other habitat-dependent economic and cultural activities. A *National Strategy* provides all those concerned about the future of coastal and estuarine habitats with tools to set priorities and allocate resources

to achieve our target—ensuring that we can all work to achieve sustainable, productive, and diverse coastal and estuarine habitats for present and future generations.

Our desire to ensure that these places continue to nurture our fish and wildlife, our lifestyles, our spirits, and our economy is why we developed *A National Strategy for Coastal and Estuarine Habitat Restoration*.



A NATIONAL STRATEGY – *Partners and Participants*

We wish to thank the following agencies, organizations, and individuals for their participation and support:

Federal Partners and Participants

U.S. Army Corps of Engineers
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National Oceanic and Atmospheric Administration
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Non-Governmental Partners and Participants

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Steve Emmett-Mattox, Restore America's Estuaries

Restore America's Estuaries

Restore America's Estuaries is a national alliance of community-based environmental organizations from the East, West, and Gulf coasts with a combined membership of over 250,000 citizens. Its mission is to preserve the nation's network of estuaries by protecting and restoring the lands and waters essential to the richness and diversity of coastal life. Restore America's Estuaries is leading a national campaign to restore one million acres of estuarine habitat by the year 2010.

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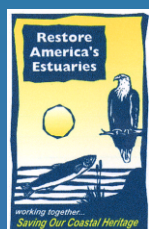
National Oceanic and Atmospheric Administration

NOAA was founded in 1970 to predict environmental changes, protect life and property, provide decision-makers with reliable scientific information, and foster global environmental stewardship. Today, several NOAA programs are involved in restoring degraded coastal and estuarine habitats, advancing the science underlying coastal and estuarine restoration, and transferring restoration technology to the private sector and other public agencies.



*There can be no purpose more inspiring
than to begin the age of restoration,
reweaving the wondrous diversity of life
that still surrounds us.*

—Edward O. Wilson



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